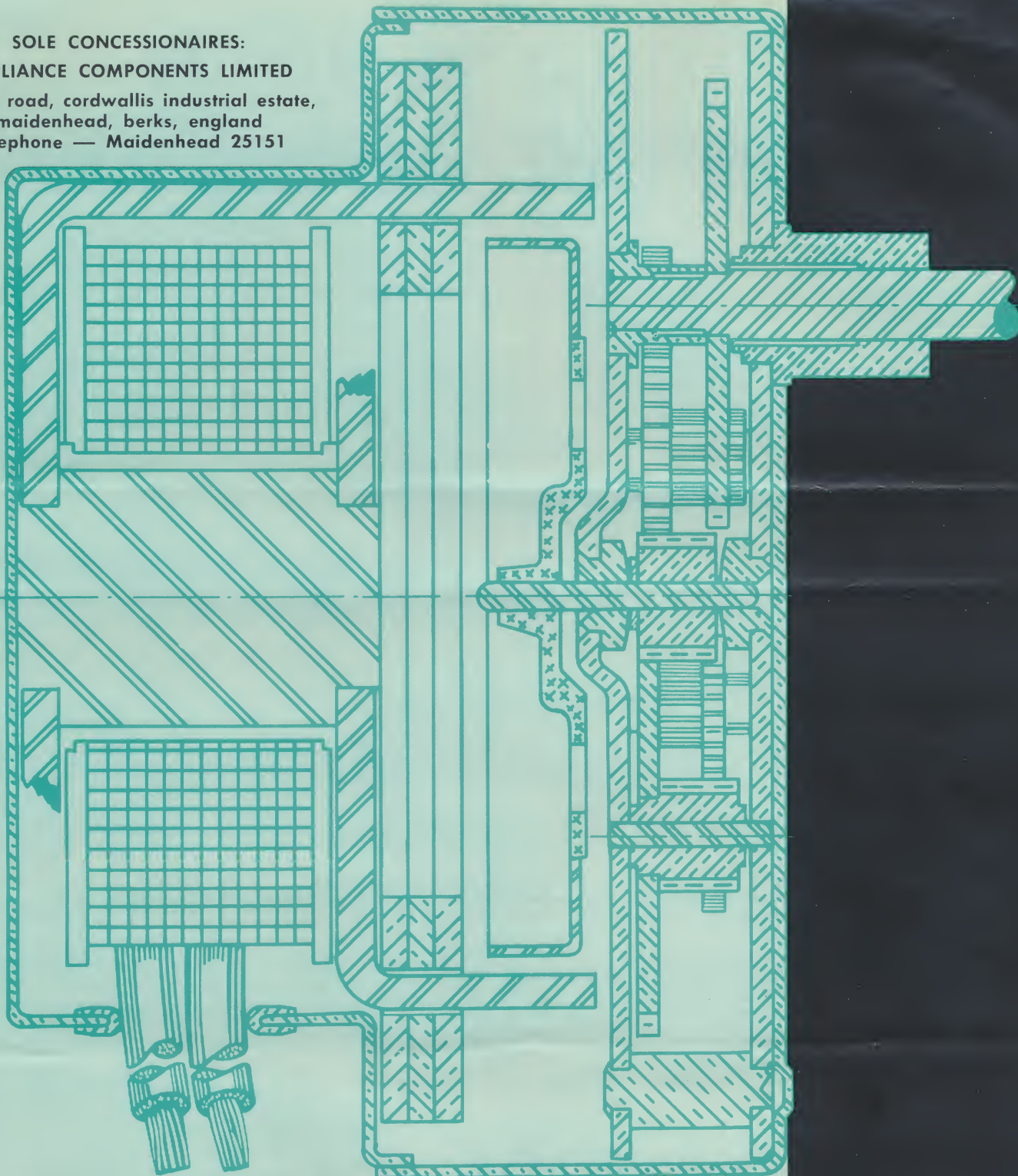


SOLE CONCESSIONAIRES:
APPLIANCE COMPONENTS LIMITED
martin road, cordwallis industrial estate,
maidenhead, berks, england
Telephone — Maidenhead 25151



BRISTOL TIMING MOTORS

BRISTOL **B** MOTORS

Division of Vocaline Company of America, Inc.
Old Saybrook, Connecticut



BRISTOL MOTORS

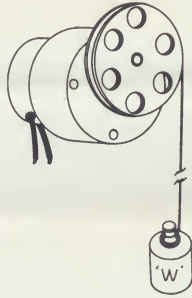
MOTOR DATA AND DEFINITIONS

DESIGNED FOR POWERFUL, DEPENDABLE PERFORMANCE, BRISTOL SYNCHRONOUS TIMING MOTORS ARE VERSATILE AND COMPACT, PROVIDING MAXIMUM POWER AND MINIMUM SIZE OVER A WIDE RANGE OF TIMING AND CONTROL APPLICATIONS.

Timing motors fall into an entirely different classification than other types of motors. Torques are considerably less than with integral or fractional hp units. Although there are no industry standards, certain accepted data have evolved — among which are the practices and definitions described below:

TORQUE

The amount of load carried by a motor under a given set of conditions. To measure torque, a pulley is fastened to the output shaft and a weight hung from a cord wrapped around the pulley. Torque, then, is the product of the radius of the pulley and the applied weight. It is usually expressed in inch ounces or inch pounds. The applicable types of torque are described below.



STARTING TORQUE

The maximum amount of torque under which a motor will start at a given voltage. This voltage is usually the rated voltage as stamped on the motor nameplate.

RATED STARTING TORQUE

Guaranteed minimum starting torque as rated by the manufacturer. Rated starting torque figures are guaranteed cold starting torques of motors at time of shipment. The typical torque figures and curves are intended to be used for guidance and technical assistance.

Torque figures specified cover a 1 RPM motor at rated voltage. Torque at any speed is equal to the 1 RPM value divided by the speed. Torque figures are affected by the temperature of the motor, the torque decreasing slightly as the motor reaches its operating temperature. Unless otherwise stated, the torque figures here are those of a cold motor.

RUNNING TORQUE OR STALL TORQUE

Either term describes the maximum amount of torque that a motor will carry without stalling. Stall torque curves are normally run with the motor up to temperature. Stall torque represents a useful extra torque in a given application. Thus, if a motor is able to start a load, it has a wide margin of torque to carry over tight spots in the driven device, or to pick up an additional intermittent load.

On most Bristol "Circle B" motors, running torque is about twice the starting torque.

SLIP

The deviation from rated speed, figured as a percentage of rated speed. For example, a motor rated at 10 RPM would run at 9 RPM if loaded to the point where it had 10% slip. In most cases, slip occurs in overloaded conditions.

LIFE

The expected life of any standard Bristol motor is several years of continuous running under rated torque and normal ambient conditions. Intermittent duty should extend this expected life. Improvements in the heat dissipation characteristics of the device in which the motor is mounted will improve life. These improvements would take the form of increasing the motor ventilation and/or increasing the weight of metal attached directly or indirectly to the motor, thereby increasing the size of the "heat sink."

Certain types of loads (shock loads, resilient loads, etc.) put more severe duty on the gear train, and might reduce expected life under some conditions. No general guarantee of life can be made. However, a guarantee of one year minimum operation can be extended to any application approved by our Engineering Department.

SYNCHRONOUS TORQUE

The maximum torque which a motor will develop running precisely at rated speed without any slip or cumulative error. The load must nor-

mally be kept under this figure in applications where exact timing is a requirement.

EFFECTIVE SYNCHRONOUS TORQUE

The amount of torque which will cause the motor to slip a specified amount, but where the amount is negligible for practical purposes. It is often possible to load motors to the point where there is slight slip for brief periods where the effect on the timing cycle is not significant.

RATED GEAR TRAIN LOAD

This is expressed in torque units (inch ounces or inch pounds) and relates to the strength of the gear train. It is a measure of how much load the motor will carry in comparison with the previously-discussed torques which all apply to what the motor will produce. There are two types of ratings: (1) intermittent load rating: the static load the gear train is guaranteed to withstand without breakdown; (2) continuous load rating: the maximum recommended continuous load that the manufacturer feels the motor will withstand for optimum life. All gear trains on standard Bristol motors have an intermittent load rating of 5 in. lbs. (80 in. oz.) and a continuous load rating of 20 in. oz. These values are independent of motor speed. (Higher load rated gear trains may be built on special order.)

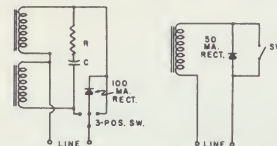
In most cases, the load rating will differ from the rated starting torque. Naturally, the lower of the two values will be the one upon which the selection should be based. For example, a ¼ RPM Model 444 would have a rated starting torque of $25 \div \frac{1}{4}$ equals 100. in. oz. However, since the gear train will only withstand 80 in. oz., this rated starting torque is not useable.

STARTING LAG

The slight initial loss in time due to the inertia of the moving parts of the motor. It only amounts to a fraction of a second in timing motors. This is important in extremely high-speed timing applications and for such cases, the Bristol clutch motor reduces lag to milliseconds.

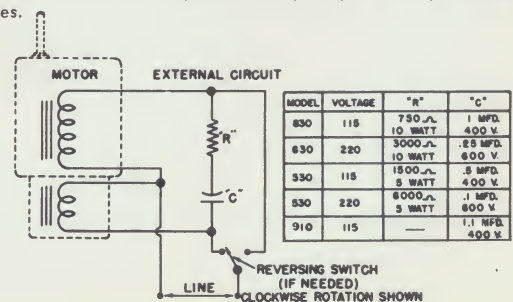
COAST

Coast is the amount of time a motor will continue to rotate when de-energized. If coast is objectionable, a braking effect can be obtained on Bristol motors by using a rectifier across the operating switch in accordance with the diagram. Model 830 and 447 motors may be obtained with an internal brake. Shaft position (vertical up, horizontal, etc.) must be specified. The two methods of braking are equally effective.



WIRING DIAGRAM FOR REVERSIBLE MOTORS

The reversible type motors, Models 530 and 830, are generally sold without the resistors and condensers required in the phase shift network. Since these are standard components, they may be easily obtained from local sources.



MOTOR APPLICATION A

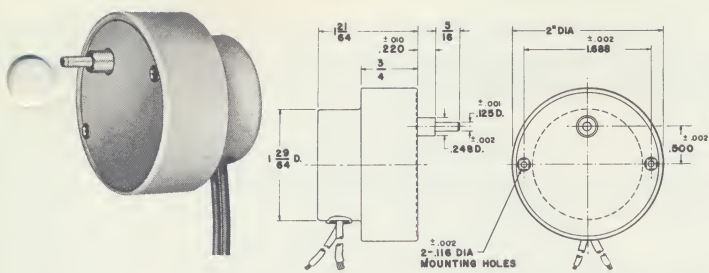


FIG. 1 (MODELS 247-425-444-447-647)

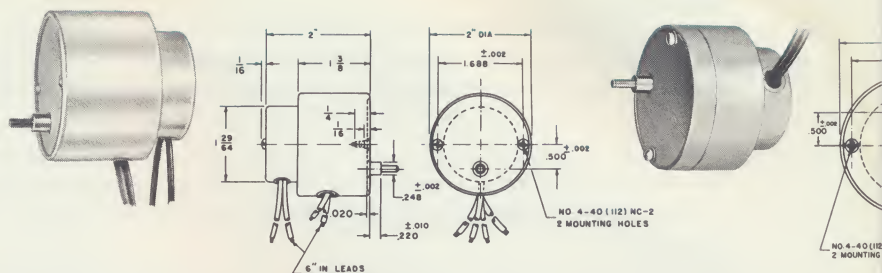


FIG. 2 (MODELS 530-830)

FIG.

MODEL	247 (FIG. 1)	425 (FIG. 1)	444 (FIG. 1)	447 (FIG. 1)	647 (FIG. 1)
DESCRIPTIONS	This unit has low temperature rise for high ambient operation. This gives longest life at light loads.	A low cost, low torque uni-directional motor for most light and medium duty applications.	The standard uni-directional timing motor with higher torque for more demanding applications.	Our highest torque uni-directional motor for continuous duty applications. Available with brake.	High starting torque, low synchronous torque for intermittent operation where excess heat is adequately dissipated.
TYPE	UNI-DIRECTIONAL, SHADED POLE, SYNCHRONOUS HYSTERESIS MOTOR				
RATED TORQUE AT 1 RPM AT RATED VOLTAGE (IN. OZ.)	16	16	25	40	50
TYPICAL STARTING TORQUE (IN. OZ.)	22	24	32	45	56
TYPICAL RUNNING TORQUE (IN. OZ.)	67	62	71	81	85
TYPICAL SYNCHRONOUS TORQUE (IN. OZ.)	41	27	34	37	18
COIL TEM. RISE AT RATED VOLTAGE ON 4x4 ALUMINUM PLATE IN FREE AIR	40	50	50	50	97
UL APPROVED	YES	YES	YES	YES	NO
POWER CONSUMPTION	2.5 watts 4 VA	4 watts 5.75 VA	4 watts 5.75 VA	4 watts 5.75 VA	6 watts 9.5 VA
TORQUE CURVES	TORQUE CURVE FOR MODEL 247. The graph plots Torque (Inch Ounces at 1 R.P.M.) on the y-axis (0 to 80) against Volts on the x-axis (40 to 120). Three curves are shown: 'START' (rising from ~10 at 60V to ~22 at 80V), 'SYNC' (peaking at ~41 at 80V), and 'RUN' (rising from ~16 at 80V to ~67 at 120V).	TORQUE CURVE FOR MODEL 425. The graph plots Torque (Inch Ounces at 1 R.P.M.) on the y-axis (0 to 80) against Volts on the x-axis (40 to 120). Three curves are shown: 'START' (rising from ~10 at 60V to ~24 at 80V), 'SYNC' (peaking at ~27 at 80V), and 'RUN' (rising from ~16 at 80V to ~62 at 120V).	TORQUE CURVE FOR MODEL 444. The graph plots Torque (Inch Ounces at 1 R.P.M.) on the y-axis (0 to 80) against Volts on the x-axis (40 to 120). Three curves are shown: 'START' (rising from ~10 at 60V to ~32 at 80V), 'SYNC' (peaking at ~34 at 80V), and 'RUN' (rising from ~25 at 80V to ~71 at 120V).	TORQUE CURVE FOR MODEL 447. The graph plots Torque (Inch Ounces at 1 R.P.M.) on the y-axis (0 to 80) against Volts on the x-axis (40 to 120). Three curves are shown: 'START' (rising from ~10 at 60V to ~45 at 80V), 'SYNC' (peaking at ~37 at 80V), and 'RUN' (rising from ~40 at 80V to ~81 at 120V).	TORQUE CURVE FOR MODEL 647. The graph plots Torque (Inch Ounces at 1 R.P.M.) on the y-axis (0 to 80) against Volts on the x-axis (40 to 80). Three curves are shown: 'START' (rising from ~10 at 60V to ~56 at 80V), 'SYNC' (peaking at ~18 at 80V), and 'RUN' (rising from ~50 at 80V to ~85 at 120V).

The Rated Torque above is guaranteed for all motors. All other figures are typical and intended for application guidance.

AND SUMMARY SHEET

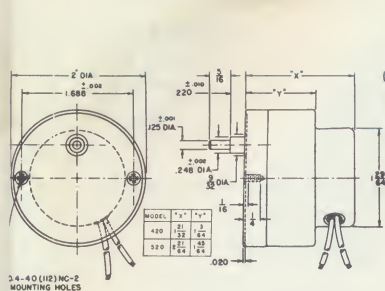


FIG. 3 (MODEL 420)

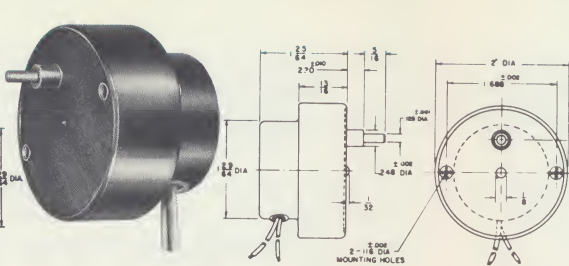


FIG. 4 (MODEL 350)

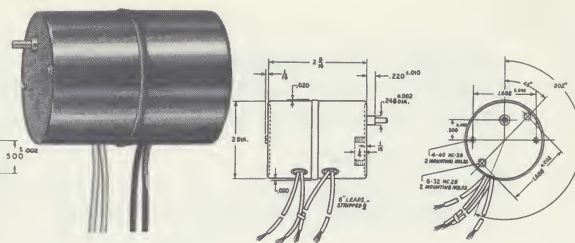


FIG. 5 (MODEL 910)

7 (FIG. 1)	530 (FIG. 2)	830 (FIG. 2)	910 (FIG. 5)	420-(520) (FIG. 3)	350 (FIG. 4)
torque with ous torque for operation, or heat can be dissipated.	Exceptionally versatile motor for uses where reversibility or high running torque is required.	High torque reversible motor for intermittent operation, or where excess heat can be adequately dissipated. Available in both shift and brake models.	High starting and running torque reversible synchronous motor. Designed for rugged intermittent duty operation, or where excess heat can be adequately dissipated.	For use where speeds of 1/20 RPM and lower are required. Incorporates an additional gear train on Model 425 for uni-directional use and Model 530 for reversible operation. Torque is limited to the rated torque of the gear train. (See motor data for specifications of gear train.)	Internal shift motor where the rotor disengages from the gear train when de-energized permitting free rotation of shaft. Available in most standard speeds from 1 RPM to 180 RPM. Axial rotor shift with built-in solenoid assures positive engagement and disengagement of the clutch in all positions.
REVERSIBLE, CAPACITOR RUN, SYNCHRONOUS HYSTERESIS MOTOR				420 SAME AS MODEL 425 FOR UNI-DIRECTIONAL. 520 SAME AS MODEL 530 FOR REVERSIBLE.	UNI-DIRECTIONAL, SHADED POLE, SYNCHRONOUS HYSTERESIS MOTOR
0	45	100	200	"	16
6	52	125	220	"	22
5	102	150	300	"	60
8	35	28	200	"	20
7	50	105	70	"	50
0	YES	NO	NO	YES	YES
atts VA	5 watts 6 VA	8 watts 11 VA	12 watts 13 VA	"	4 watts 5.75 VA
				TORQUES ON MODEL 420 (520) ARE LIMITED TO GEAR TRAIN RATING OF 20 IN. OZ. CONTINUOUS; 5 IN. LBS. INTERMITTENT DUTY.	

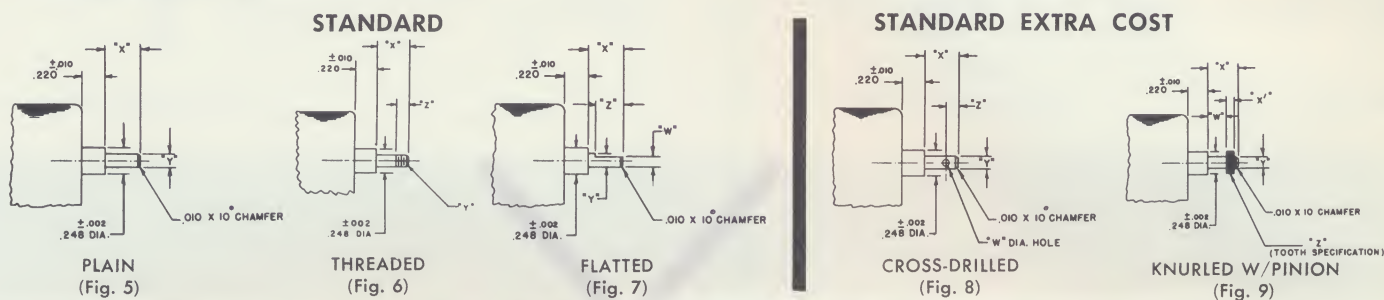
GENERAL SPECIFICATIONS

VOLTAGE AND FREQUENCY

Standard voltage and frequency on all units is 115 Volts, 60 Cycles. Virtually any voltage may be furnished on special order. Motors other than 60 Cycle can be made in most speeds on special order.

OUTPUT SHAFTS

Standard output shafts are case-hardened steel. Different configurations as well as modifications other than the standards shown are readily available.



CODE	X	Y	CODE	X	Y	Z	CODE	W	X	Y	Z	CODE	W	X	Y	Z	CODE	X	Y	Z	X ¹	W
26D	5/16	.125	10D	5/16	5-40 RH	1/8	27D	.093	5/16	.125	1/4	56D	.062	5/16	.125	1/8	556D	5/16	.125	12T, 32P .437 OD 14 1/2° PA	1/8	1/16
41D	13/16	.125	60D	5/16	5-40 LH	1/8	511D	.093	1/2	.125	7/16	349D	.062	5/16	.125	1/16	557D	9/32	.125	18T, 64P .312 OD 14 1/2° PA	3/32	1/8
75D	1/2	.125					93D	.093	3/8	.125	1/4	192D	.062	5/16	.125	5/32	558D	7/16	.125	19T, 60P .347 OD 14 1/2° PA	1/8	15/64
82D	3/8	.125																				

OUTPUT PINIONS

These may be furnished to specifications by Bristol or supplied to us and pressed on the output shaft. It is recommended that this assembly be done at our plant when required.

BEARINGS

The standard Bristol motor is supplied with a Type D bearing. This and other stock bearings are characterized as follows:—

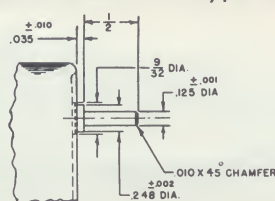
Type D — Sleeve-type extended output bearing. (See shaft drawings for dimensions).

Type K — (Fig. 10) Short bearing where for reasons of clearance a minimum bearing is required.

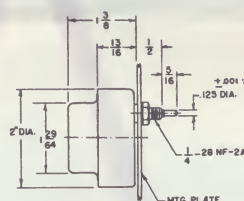
Type F — (Fig. 11) For side and down thrust applications where the motor is mounted on the bearing. Also used where interchangeability with pear-shaped or other type motors is necessary.

Type B — (Fig. 12) Ball-bearing and shaft configuration for thrust applications of a general nature handling up to 5 lbs. thrust in any direction. This bearing is not recommended for extremely high-speed applications. The shaft has a 3/16" diameter.

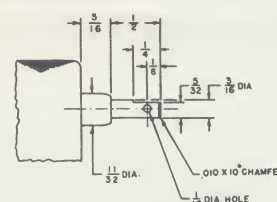
Fig. 10, 11, 12 shown with typical shafts.



(FIG. 10) CODE 26K



(FIG. 11) CODE 408F



(FIG. 12) CODE 201B

AVAILABLE SPEEDS

The flexible design of the Bristol gear train enables us to supply a large variety of speeds. The following group listing covers the gear trains on which we maintain permanent stock and on which immediate delivery can be assured. Other speeds are available. All speeds listed are for 60 Cycle operation. Those marked * are also available at 50 Cycles.

GROUP I

RPM: 4/5, 1*, 1.2, 1.33, 1.5*, 1.67*, 1.75, 1.8, 2*, 2.4, 3*, 3.6, 4*, 4.5*, 4.8, 5*, 5.4, 6*, 7.2, 7.5*, 8, 9, 10*, 12*, 15*, 16, 18, 20*, 24*, 25*, 28, 30, 32, 40*, 45, 50*, 56, 60*, 72, 75*, 90, 101, 150*, 160, 180, 200*, 240, 300*, 360, 400*, 600*, 720, 900, 1020, 1200, 1500*, 1800

GROUP II

RPM: 1/6*, 1/5, 1/4*, 1/3*, 2/5, 1/2*, 3/5, 2/3*

GROUP III

RPM: 1/18*, 1/15, 1/12*, 1/10, 1/9*, 1/8, 1/7.

GROUP IV

RPH: 1/4*, 1/3*, 1/2*, 2/3*, 3/4*, 1*, 1.33*, 2*, 2.4*, 3*, 4*, 5*, 6*.

RPD: 1/31*, 1/30*, 1/24, 1/15*, 1/8*, 1/7, 1/5, 1/3*, 1/2*, 1*, 1.5*, 2*, 3*, 4*.

RPM = Rev. Per Min.; RPH = Rev. Per Hour; RPD = Rev. Per Day

LEADS

Standard motors are supplied with 6 inch leads (stripped 1/2 inch). Lead wire is #22 stranded wire, with 1/32 thick, 105° thermoplastic insulation.

MATERIALS

All standard Bristol motors are supplied with steel pinions, brass or phenolic gears, polished and ground shafts and gear studs, brass gear frames, bronze output bearings and impregnated bronze graphite rotor bearings. Standard covers are aluminum for all motors, with the exception of the Model 420, which has a brass cover. The Models 350 & 950 are provided with a black anodized aluminum cover.

LUBRICANT

The standard lubricant recommended for most applications will withstand an ambient of -10°C through $+65^{\circ}\text{C}$. A wide-range lubricant is available permitting operation from -55°C to $+65^{\circ}\text{C}$.

CLUTCHES

One-way and two-way friction clutches are available in all motors at extra cost.

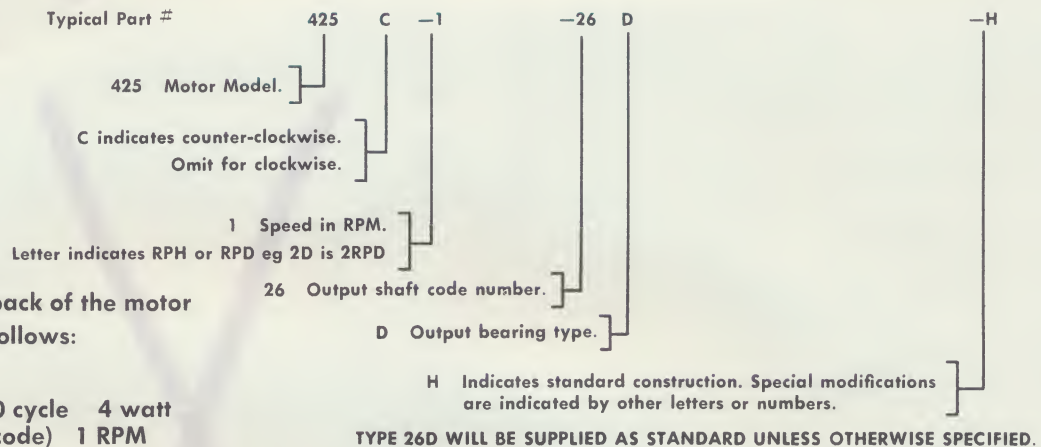
APPROVALS

All motors listed in this catalogue, with the exception of the Models 647-830 and 910, are listed by Underwriters Laboratories, Inc. and the Canadian Standards Association. The Models 647 and 830 motors have both been approved in special cases where limited duty cycles were assured or where excess heat can be adequately dissipated.

MILITARY CONSTRUCTION

Military-type construction may be specified on any motor, in which case the motor would be supplied with plated or anodized parts, fungus-proof construction and built in general conformity with most military standards.

ORDERING INFORMATION



CUSTOMIZED ELECTROMECHANICAL DEVICES

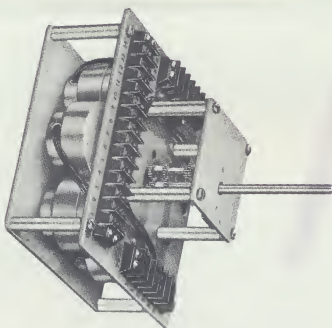
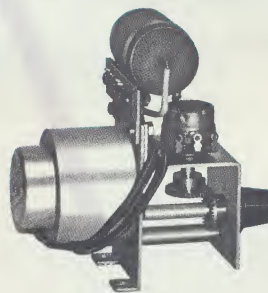
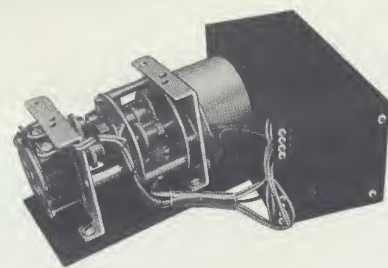


CHART DRIVE



POTENTIOMETER DRIVE



RAMP GENERATOR

BRISTOL-DESIGNED TO YOUR SPECIFICATIONS

Bristol Motors' ability to design and produce specialized devices in both the timing and non-timing areas is amply demonstrated by the products in this catalog. We welcome the opportunity to develop and manufacture sub-assemblies and components engineered to specific customer requirements. Most of these applications are as varied as time itself, and our proven engineering leadership and production experience is your assurance of obtaining the very finest product tailored to your needs.

NOTE: Information contained herein is for general reference only and is subject to change without notice.



BRISTOL MOTORS, DIVISION OF VOCALINE COMPANY OF AMERICA, INC.
Old Saybrook, Connecticut
B-10



BRISTOL
TIMING
CONTROL
PRODUCTS

TIMERS/MOTORS
ELECTROMECHANICAL
DEVICES

BRISTOL **B** **MOTORS**

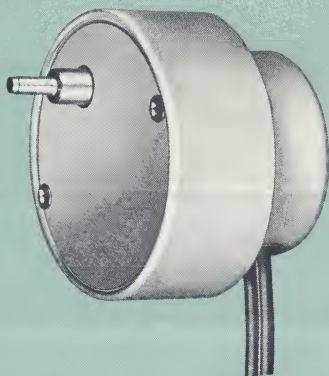
*Div. of Vocaline Co. of America, Inc.
Old Saybrook, Conn.*

SYNCHRONOUS MOTORS

Designed for powerful, dependable performance, Bristol synchronous timing motors are versatile and compact, providing maximum power and minimum size over a wide range of timing and control applications.

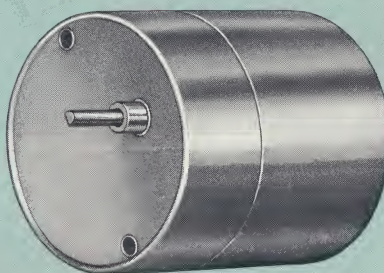
FEATURES AND SPECIFICATIONS:

Speeds from 1800 RPM to as low as 1 Revolution Per Month for 60-cycle operation.
High starting torque with running torque considerably higher.
Exceptionally compact size—the motor is 2 inches in diameter.
May be operated in any position.
Impregnated bronze-graphite rotor bearings.
Most gears hobbled for efficient operation and long life.
Moisture and dust-proof type construction throughout.
All standard motors are approved by UL and CSA except Models 647 and 830.

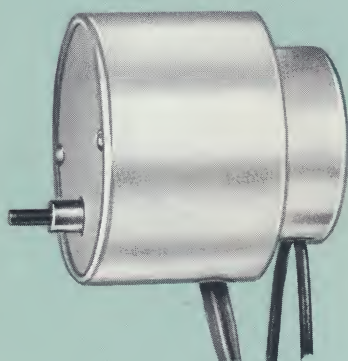


BASIC TIMING MOTOR. The standard Bristol motor for light and medium duty in uni-directional use, 2 in. diameter x 1-21/64 long, with through hole mounting. Available in a wide variety of output shafts and the following torque ratings: *

Model	Watts	Rated Starting Torque at 1 RPM*
247	2.5	16 in. oz.
425	4	16 in. oz.
444	4	25 in. oz.
447	4	40 in. oz.
647	6	50 in. oz.



MODEL 318 TRANSISTORIZED DC MOTOR. This DC motor consists of a synchronous hysteresis motor included with a transistorized inverter circuit. Ideal for long, reliable use in high humidity or saline atmosphere, with no objectionable radio noise. Speed ranges from 1/20 to 400 RPM. Speed accuracy $\pm 10\%$; 16 in. oz. starting torque at 1 RPM. Suitable for ambient temperatures ranging from -30 degrees C to $+50$ degrees C. Model 318 diameter 2" x 2 3/8" long. For further information request Bulletin B-15.

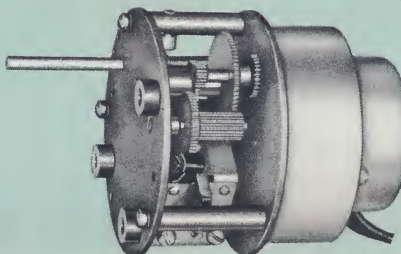


REVERSIBLE SYNCHRONOUS MOTOR. A versatile, low-cost motor for remote control and high torque applications. This motor operates by means of a condenser phase shift network, and offers positive reversibility in the following ratings: *

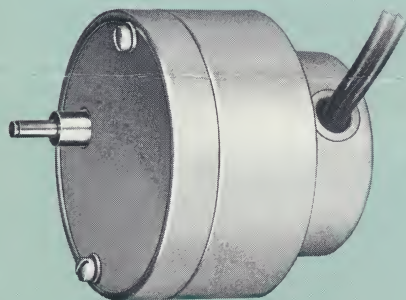
Model	Watts	Rated Starting Torque at 1 RPM*
530	5	40 in. oz.
830	8	5 in. lbs.

These are 2 inches in diameter, and 2 inches long.

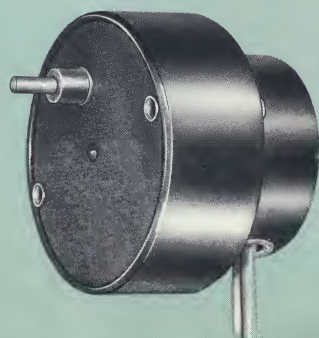
*Torque ratings are developed motor torque. All standard gear trains are rated for 20 in. oz. maximum continuous running, 5 in. lbs., static torque rating.



MODEL CM CLUTCH MOTOR. Consists of standard motor coupled to an output shaft through a differential. The differential is operated by means of a solenoid triggered clutch, engaging and disengaging the shaft. The shaft can be spring-loaded, allowing it to return to original position when the clutch is de-energized. Typical uses: reset type timers, high speed timers, chart drives, potentiometer drives, remote controls. Dimensions 2-1/4" diameter x 2-1/2" long. For further information request Bulletin 16.

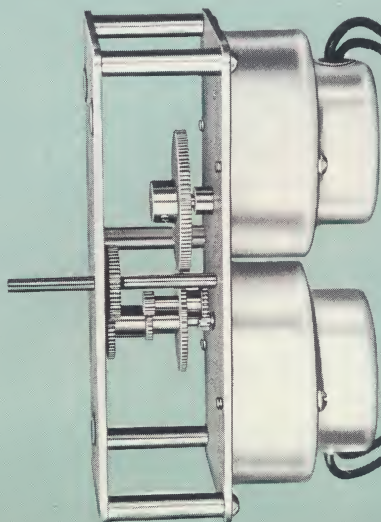


MODEL 420, LOW SPEED MOTOR. Consists of basic Model 425 motor with an additional gear train providing reductions down to 1 Revolution Per Month. Intended for special timers, chart drives, etc. The torque is rated at 20 in. oz. maximum for continuous duty and 5 in. lbs. for static and intermittent loading. 2 inch diameter x 1-21/32 long. (420 type of construction also available in reversible and DC motor models). *



MODEL 450, INTERNAL SHIFT MOTOR. The rotor is disengaged from the gear train when de-energized permitting resetting. A built-in solenoid assures positive engagement and disengagement of the clutch in all positions. Output torque rated at 9 in. oz. Available in speeds of 1 RPM to 180 RPM. Dimensions 2" dia. x 1-23/64" long. (Similar shift type action available on Type 830 reversible motor). *

* For further information on the models above request Bulletin B-10.



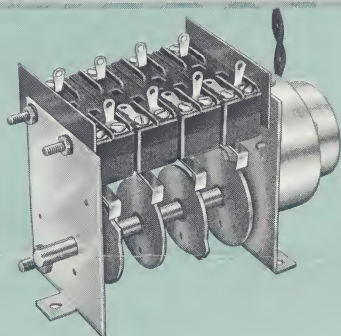
MODEL DSU-100 DUAL SPEED UNIT. Consists of two motors assembled to a common output shaft through a differential. Output speed is the sum of the two motor input speeds. Therefore, two different speed uni-directional motors provide a choice of 3 output speeds (either motor speed or the sum of the two motor speeds). Available with reversible motors for further variations in output speed. Standard units also available incorporating 3 and 4 motors providing up to 40 output speeds with electrical switching. Dimensions depend on the design of the unit in question. For further information request Bulletin 16.

TIMERS

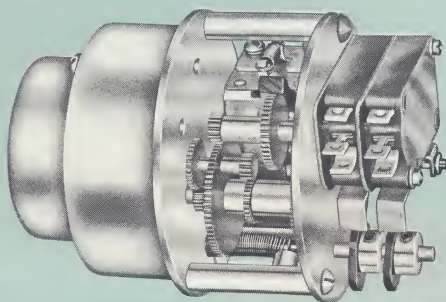
Versatility is the characteristic which design engineers need—and find—in Bristol Timing Devices. Bristol's unusually broad experience and range of design and manufacturing skills are particularly valuable where special requirements must be met.

The timing devices shown below are among the most widely used. All can be mounted in any position, and take a minimum of space. Materials are selected on the basis of their suitability to provide long service, and perform well under a variety of conditions.

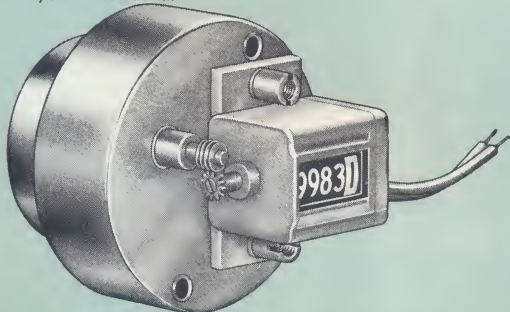
Bristol engineering service is available for applications that require custom design and manufacture.



SERIES 31 REPEAT CYCLE TIMER. Low-cost, multi-contact timer with high repeat accuracy. For vending machines, home appliances, industrial program controls. Speed Ranges: 1 Revolution Per Second to 1 Revolution Per Month. Motors: standard; high torque reversible. Switch Rating: 20 amp. at 115-230 V AC (also in 1/2 hp. at 125 V AC). Switches: enclosed snap action type. Cams: pre-cut, factory adjusted (also available — dual cams with set screws for field adjustment).*



SERIES 21 TIME DELAY RELAY. General timer for instantaneous reset-type action, such as timers for photography, electronic safety, alarms, signals, etc. (Life expectancy over 1 million cycles.) Compact. Quick reset time (well under 1/5 second). Repeat accuracy better than 1% full scale. Time setting: 15 seconds to 3 months full scale. Rating: 10 amp (non-inductive load), Voltage: 115 V AC, 60 cycles standard.*



SERIES 41 ELAPSED TIME INDICATOR. Adaptable for panel or unit mounting, this low-cost series features simple installation, a choice of three models with non-reset counter. Reset and larger size counters available on special order. Maximum readings on non-reset units from 99,999 minute to 99,999 hours. 115 V AC, 60 Cycle standard. 50 Cycle and other voltages available.*

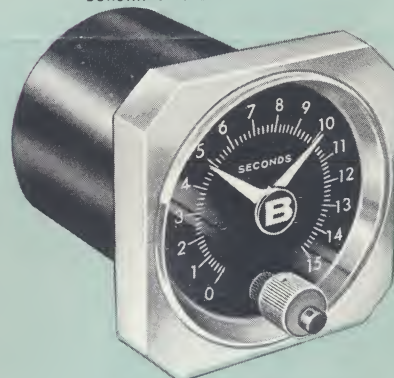
* For further information on the three models above request Bulletin B-13.

PANEL TIMERS

Bristol's Panel Timers are distinguished by their functional, modern appearance. All parts are easily accessible. Vertically mounted silver-cadmium contacts are self-cleaning, stay dust-free. New dial design for better viewing, also permits easy adjustment without covering timer hands. Lightweight, rugged die-cast Zamac frame, sealed and beveled glass dial face.



SERIES 61 TIME DELAY RELAY. Universal Time Delay Relay provides self-holding solenoid starting with adjustable timed contact operation. Type 6110 provides three types of load contacts which give seven types of load circuit operation in a single unit. This model may be wired up to one of four basic types of operation: momentary start, automatic reset; momentary start, manual reset; sustained switching; and tandem or cascaded operation. Size: 3" in diameter by 5-1/16 long. Timer case bezel 19/32 thick x 3-5/8 inches square. Universal mounting allows standard 3-stud or 4-stud panel mounting. For further information request Bulletin No. B-11.



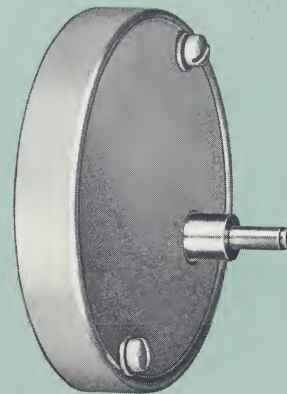
SERIES 62 TIME DELAY RELAY. Companion to the 61 series timers. This model is operated by a manual push button start on the face of the timer and provides unusual circuit versatility. This unit times out to the zero position and remains timed out until started by the manual push button. This timer does not reset on power failure. Size, 3 inches in diameter x 3-1/4 long. Intended for lower cost variable delay timer operations. For further information request Bulletin B-12.

OTHER QUALITY BRISTOL PRODUCTS



MODEL 2T-20 TWO-TIMER

Rugged, accurate, versatile 20-hour timer for general use. High rating (1650 watts) makes it ideal for turning laboratory, office, industrial and other equipment on or off after a specified time. Only 2" x 2" x 4" . . . weighs just 1 lb. (Available with three wire grounded socket and plug on special order). For further information request Bulletin B-14.



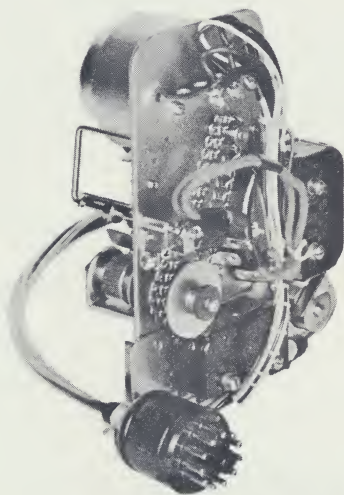
SERIES GT-1 GEAR TRAINS

Compact, inexpensive gear train, available in a wide range of speeds.

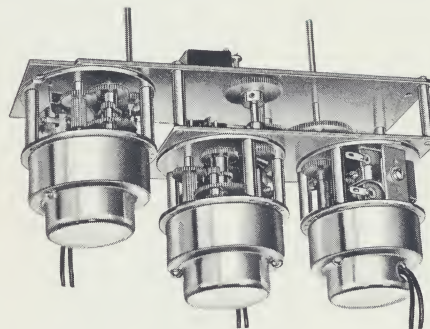
Completely enclosed, with 3/64" input shaft and 1/8" output shaft.

Easily mounted from either side.

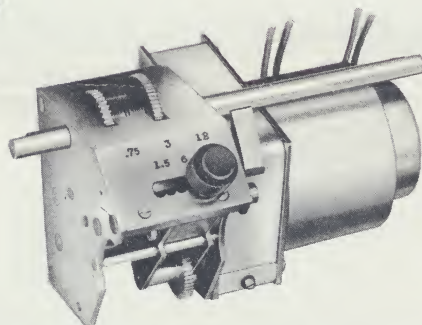
CUSTOMIZED ELECTROMECHANICAL DEVICES



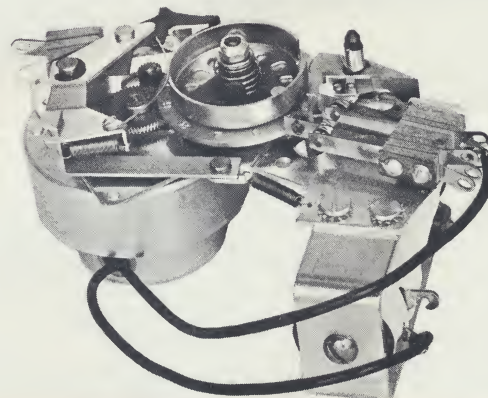
WESTERN UNION TAPE CRIMPER



QUARIE SPECIAL TIMER



TEXAS INSTRUMENTS CHART DRIVE AND TRANSMISSION



IBM CODED SIGNAL RECEIVER

ENGINEERING SERVICE

Our Engineering Department is second to none in size and experience. The Bristol Engineering Staff is available to custom design motors and timing devices for those applications not encompassed by our standard models. Since most users have applications as varied as time itself, our design and consulting service is your assurance of receiving a custom unit tailored to your needs.

NOTE: Information contained herein is for general reference only and is subject to change without notice.



BRISTOL MOTORS

• DIVISION OF VOCALINE COMPANY OF AMERICA, INC.

• OLD SAYBROOK, CONNECTICUT

BRISTOL

division of Vocaline Company of America, Inc.

MOTORS

Old Saybrook, Conn. • EVergreen 8-3414

July 18, 1967

Mr. T. Nelson,
Systems Consultant
Box 1546
Poughkeepsie, New York 12603

Dear Mr. Nelson:

Thank you for your recent inquiry concerning our Series 4405 Clock Drive motor. At the present time a formal catalogue sheet is not available; however, please be assured that as soon as a catalogue sheet is in print, it will be sent to you.

In the meantime, we have taken the liberty of enclosing literature which describes our line of motors and timing devices. We take great pride in our product line and in our ability to produce customized electro-mechanical devices, and we or our representative listed below welcome the opportunity to review your specific application.

In order to continue providing the finest products and service in our industry we are constantly trying to anticipate customer needs. Therefore, we have enclosed a short questionnaire which we hope you will be kind enough to complete. A stamped self-addressed envelope is provided for your convenience.

We look forward to hearing from you and hope that you will take advantage of our capabilities.

Thanking you in advance for your cooperation, we remain

Very truly yours,
BRISTOL MOTORS/TIMERS division of
VOCALINE CO. OF AMERICA, INC.

Larry De Kennarofsky
Sales Department

ENCLOSURES

Our representative in your area is --

C.W. Floring & H.R. Murray, Inc.
6585 Kinne Road - DeWitt P.O. Box 11
Syracuse, New York 13214

Divisions:

VOCALINE ELECTRONICS: Designers and
Manufacturers of Communications Systems

• BRISTOL MOTORS: Manufacturers of
Synchronous Motors, Timing Devices

• LAMCO: Laboratory for Advanced Military
Communications - Waldoboro, Maine

V



Mr. T. Nelson,
Systems Consultant
Box 1546
Poughkeepsie, New York 12603

Please indicate your primary responsibility

- ☐ Design Engineering
- ☐ Application Engineering
- ☐ Purchasing
- ☐ Other (Please specify)_____.

Principal product manufactured by your company_____.

Is your request for information for:

- ☐ An Immediate Application
- ☐ Future Anticipated Need
- ☐ Reference Only

If you have an immediate use or future need, please indicate your estimated annual usage _____.

Do you presently have or anticipate having a need for other types of timers or motors ☐ yes ☐ no. If yes, please indicate timer or motor type and estimated annual usage.

- ☐ Repeat Cycle Timers or Programming Timers
- ☐ Fixed Interval Timers
- ☐ Adjustable Interval Timer
- ☐ Elapsed Time Indicators
- ☐ Time Delay Relays
- ☐ Time Delay Timers
- ☐ Percentage Timer
- ☐ Solid State Timer
- ☐ Timing Motors including Shift Motors

Annual Usage

Would you like to have a field representative call on you ☐ yes ☐ no.

Thank you for filling out this questionnaire.

BRISTOL MOTORS division of
VOCALINE COMPANY OF AMERICA, INC.

OLD SAYBROOK, CONNECTICUT

ST-168